CSC 261/461: Database Systems, Fall 2018
Homework 2
Released: 10/3
Due: 10/7, 11:59 PM

Problem 1 (8 points)

Consider the database schema below:

```
Product(maker,model, type)

PC(model, speed, ram, hd, price)

Laptop(model, speed, ram, hd, screen, price)

Printer(model, color, type, price)
```

Write the following constraints as assertions:

a) No manufacturer (maker) of PC's may also make laptops.

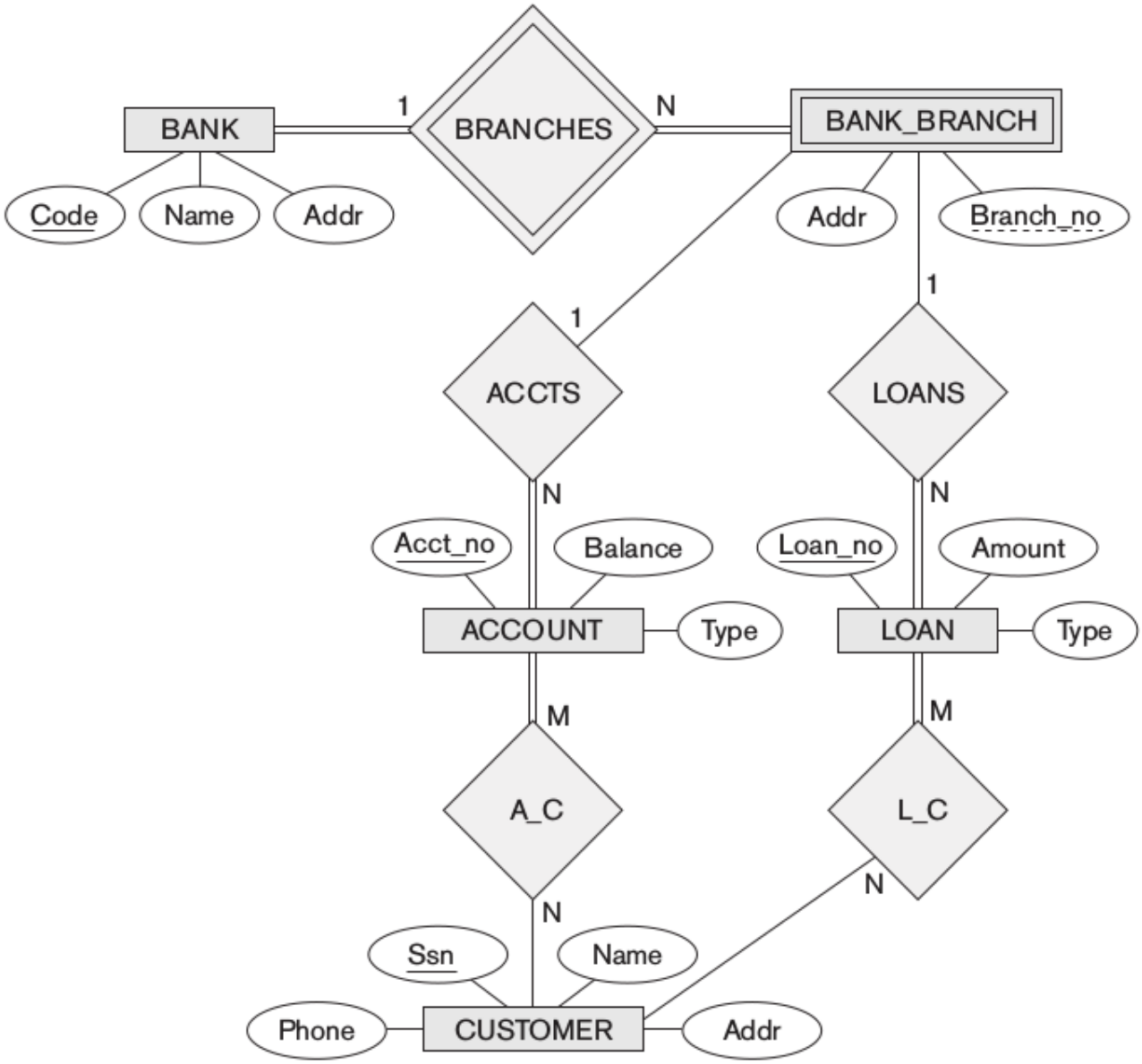
b) A manufacturer (maker) of a PC must also make a laptop with at least as great a processor speed.

c) If a laptop has a larger main memory than a PC, then the laptop must also have a higher price than the PC.

d) If the relation Product mentions a model and its type, then this model must appear in the relation appropriate to that type.

Problem 2 (8 points)

Consider the ER diagram shown in the figure below for part of a BANK database. Each bank can have multiple branches, and each branch can have multiple accounts and loans.



a. List the strong (nonweak) entity types in the ER diagram.

b. Is there a weak entity type? If so, give its name, partial key, and identifying relationship.

c. What constraints do the partial key and the identifying relationship of the weak entity type specify in this diagram?

d. List concisely the user requirements that led to this ER schema design.

Problem 3 (8 points)

Design an ER schema for keeping track of information about votes taken in the U.S. House of Representatives during the current two-year congressional session. The database needs to keep track of each U.S. STATE's Name (e.g., 'Texas', 'New York', 'California') and include the Region of the state (whose domain is {'Northeast', 'Midwest', 'Southeast', 'Southwest', 'West'}).

Each CONGRESS_PERSON in the House of Representatives is described by his or her Name, plus the District represented, the Start_date when the congressperson was first elected, and the political Party to which he or she belongs (whose domain is {'Republican', 'Democrat', 'Independent', 'Other'}). The database keeps track of each BILL (i.e., proposed law), including the Bill_name , the Date_of_vote on the bill, whether the bill Passed_or_failed (whose domain is {'Yes', 'No'}), and the Sponsor (the congressperson(s) who sponsored—that is, proposed—the bill). The database also keeps track of how each congressperson voted on each bill (domain of Vote attribute is {'Yes', 'No', 'Abstain', 'Absent'}). Draw an ER schema diagram for this application. State clearly any assumptions you make.

Note: For this problem you may find it useful to use an external source for reading more about how voting is organized.